
In This Section

- Assessment of Water Quantity
- Assessment of Water Quality

Section 5

Assessments of Water Quantity and Quality

This section provides an evaluation of the current conditions in the Ogeechee River basin, in terms of both water quantity (Section 5.1) and water quality (Section 5.2) issues. The assessment results are then combined with the evaluation of environmental stressors from Section 4 to produce a listing of Concerns and Priority Issues in Section 6.

5.1 Assessment of Water Quantity

General information about water quantity issues in the Ogeechee basin is taken from the Georgia Environmental Protection Water Availability and Use Report, Coastal Plain River Basins, Regional Economic Forecast of Population and Employment Comprehensive Study, Volume 1 and updated from other Georgia Environmental Protection Division sources where available.

5.1.1 Municipal and Industrial Water Uses

As stated in Section 3.2, the City of Warrenton is the sole municipal user of surface water in the basin. Warrenton is a small city (withdrawal permit 0.75 mgd) and it is not expected to expand or experience double digit rate of growth into the foreseeable future. Other cities in the basin rely upon groundwater for their potable water supplies, and this is expected to continue. The sole industrial user of surface water in the basin is Thiele Kaolin (withdrawal permit 1.5 mgd). It is unknown if surface water will be more heavily relied upon in the future to support kaolin industry activities in the basin.

Overview of Surface Public Water Systems

Most surface water system plants, in the State of Georgia, are facilities that utilize conventional treatment which includes coagulation, flocculation, sedimentation, filtration, and disinfection. There are a number of small package plants which use the same treatment but on a smaller scale. Intakes located in urban areas with upstream development or in rural areas with large amounts of agriculture upstream have higher

amounts of sediments (turbidity) in the rivers, streams and creeks that provide the raw surface water. These waters are prone to sudden erosion and sedimentation problems, also known as flashing, during hard rain storms which increases the amount of sediment (dirt, mud, and sand) in the water. Water with excess sediment or turbidity can clog intakes (also known as muddying) and filters requiring more sophisticated treatment and higher cost. Many plants have reservoirs to store large amounts of water and to settle out excess sediment (turbidity). Often taste and odor problems come from a natural sources of iron and manganese or algae blooms in shallow surface water. However, algae blooms can also indicate an increase in the level of nutrients in the water. All known raw water quality problems listed have been identified and fall under the individual HUC assessments in Section 7.0. All community surface public water systems are in compliance with the Georgia Rules for Safe Drinking Water.

Drinking Water Quality: Surface Water

Overall the surface water quality in the Ogeechee River basin is good for use as drinking water. All public water systems in the state of Georgia that use surface water meet federal Surface Water Treatment Rules for filtration and treatment. However, surface water quality problems due to nonpoint source pollution such as agricultural and storm water runoff are concerns to municipalities which withdraw surface water from the Ogeechee River and tributaries. The contaminant of most concern is high turbidity, especially rapid increases in turbidity, due to erosion and sediment runoff. Water high in turbidity can clog filters, interrupt the proper treatment of raw water, and increase the cost of the water to the consumers because more chemicals are needed to settle out the sediment. Many water plants have reservoirs to store large amounts of water and to settle out excess sediment (turbidity). Table 5-1 summarizes the known and potential raw water quality problems affecting drinking water supplies associated with surface water intakes within the Ogeechee basin.

Table 5-1. Known and Potential Raw Water Quality Problems Affecting Drinking Water Supplies in the Ogeechee River Basin

HUC 03060201 -						
Water System Name	Water Source Name	Number of Intakes	Reservoir that allow for WQ	Number of Water Plants	Known Raw Water Quality Problems in the Past and Potential Future Problems	Other Comments
City of Warrenton – 3010001	Rocky Comfort Creek	1	Y	1	Water quality good. High iron and manganese problems. Highly colored due to organics, low alkaline. Taste and odor problems due to algae.	Water system in compliance.

Drinking Water Quality: Groundwater

Overall ground water quality is very good for use as drinking water from wells. Since most wells used in public water systems are constructed by licensed well drillers and draw from deeper aquifers, the number of contaminated wells is small. However, in the Ogeechee River basin some public water system wells have been contaminated by local pollution sources such as leaky underground storage tanks, malfunctioning septic tank systems, and spills. Those wells that exceed the Maximum Contaminant Level (MCL) for a contaminant are either removed from service or added treatment to the system. Also, a few wells in the basin have been found to be under the direct influence of surface water

due to the geology of the area in which the well is located. These wells are monitored and have additional treatment requirements.

An additional area of concern is the Floridan aquifer in the coastal area of Georgia, specifically Chatham and the surrounding areas. Sea-water is entering the aquifer in South Carolina at Port Royal Sound and beginning to move towards the production wells on Hilton Head Island and eventually towards the City of Savannah. The Georgia Environmental Protection Division has developed a policy document relating to this contamination issue called the *“Interim Strategy for Managing Salt Water Intrusion in the Upper Floridan Aquifer of Southeast Georgia”* dated April 23, 1997. Certain policy measures like reducing Floridan aquifer usage in Chatham County and limiting increased usage from the Floridan aquifer elsewhere in the coastal area are in force. Within the Ogeechee River basin no wells have yet been closed because of increased salt content in the aquifer and none are anticipated to be closed in the near future.

5.1.2 Agriculture

As stated in Section 3.2.2, water demand for agricultural use in the Ogeechee River basin is considerable. Irrigated crops are grown in eight counties of the basin. In 1995, approximately 96% of the agriculture water used was for irrigation purposes (35.74 MGD). The remaining 4% was used for animal operations. Future agricultural water demand is expected to increase slightly within the basin to 58.70 MGD by the year 2020.

5.1.3 Recreation

As stated in Section 3.3.3, recreation activities include boating, swimming, fishing and picnicking.

5.1.4 Hydropower

There are no hydropower facilities in the Ogeechee basin.

5.1.5 Navigation

There is no commercial navigation in the Ogeechee basin.

5.1.6 Waste Assimilation Capacity

Water quality, wastewater treatment, and wastewater discharge permitting are addressed in Section 4. However, it should be noted that the guidelines for discharge of treated effluent into the rivers and streams of the Ogeechee River basin assume that sufficient surface water flow will be available to assimilate waste and ensure that water quality criteria will be met.

5.1.7 Assessment of Ground Water

Serious Floridan aquifer difficulties are being experienced in the coastal counties of Georgia impacted by the Interim Strategy. At present there are serious restrictions on use throughout the basin, including outright bans on new users in portions of southern Bryan, southern Effingham and all of Chatham county. The agricultural area from Emanuel and Jenkins to Bulloch and Evans shall soon be included in this ban. When that occurs, new irrigation in this farming area may come to a halt. Withdrawals contribute to a regional decline in aquifer levels and cannot be continued. In the past there have also been

concerns that the amount of water withdrawn from the various aquifers is leading to diminishment of river flow.

While the northern portion of the basin has had little development, there is extensive development occurring along the coastal tier of counties. Hinesville in Liberty, retirement communities near Darien in McIntosh, the suburban growth of Effingham and Bryan counties continues unchecked. More water is being requested and cannot be approved or permitted. Some areas can use alternate aquifers, but this is a very limited option. Aquifer storage and recovery (ASR) is now an issue in regard to the TSG application for a private surface water treatment facility on the Ogeechee River in Chatham County. Water would be pumped into the aquifer, and withdrawn at the same locale.

5.2 Assessment of Water Quality

This assessment of water quality is generally consistent with Georgia's water quality assessments for CWA Section 305(b) reporting to EPA. It begins with a discussion of (1) water quality standards, (2) monitoring programs, and (3) data analyses to assess compliance with water quality standards and determine use support. Following this introductory material, detailed assessment results by subbasin are presented in Section 5.2.4.

5.2.1 Water Quality Standards

Assessment of water quality requires a baseline for comparison. A statewide baseline is provided by Georgia's water quality standards, which contain water use classifications, numeric standards for chemical concentrations, and narrative requirements for water quality.

Georgia's water use classifications and standards were first established by the Georgia Water Quality Control Board in 1966. The water use classification system was applied to interstate waters in 1972 by EPD. Table 5-2 provides a summary of water use classifications and basic water quality criteria for each water use. Georgia also has general narrative water quality standards, which apply to all waters. These narrative standards are summarized in Table 5-3.

In addition to the basic water quality standards shown above, Congress made changes in the Clean Water Act in 1987 which required each state to adopt numeric limits for toxic substances for the protection of aquatic life and human health. In order to comply with these requirements, in 1989 the Board of Natural Resources adopted 31 numeric standards for protection of aquatic life and 90 numeric standards for the protection of human health. Appendix B provides a complete list of the toxic substance standards that apply to all waters in Georgia. Georgia has adopted all numeric standards for toxic substances promulgated by the USEPA's resources are made available, Georgia is also developing site-specific standards for major lakes where control of nutrient loading is required to prevent problems associated with eutrophication.

5.2.2 Surface Water Quality Monitoring

EPD's monitoring program integrates physical, chemical, and biological monitoring to provide information for water quality and use attainment assessments and for basin planning. EPD monitors the surface waters of the state to:

- collect baseline and trend data,
- document existing conditions,
- study impacts of specific discharges,

Table 5-2. Georgia Water Use Classifications and Instream Water Quality Standards for Each Use

Use Classification	Bacteria (fecal coliform)		Dissolved Oxygen (other than trout streams) ¹		pH	Temperature (other than trout streams) ¹	
	30-Day Geometric Mean ² (MPN/100 ml)	Maximum (MPN./100 ml)	Daily Average (mg/l)	Minimum (mg/l)		Maximum Rise (°F)	Maximum (°F)
Drinking Water requiring treatment	1,000 (Nov-April) 200 (May-October)	4,000 (Nov-April)	5.0	4.0	6.0-8.5	5	90
Recreation	200 (Freshwater) 100 Coastal)	--	5.0	4.0	6.0-8.5	5	90
Fishing Coastal Fishing ³	1,000 (Nov-April) 200 (May-October)	4,000 (Nov-April)	5.0	4.0	6.0-8.5	5	90
Wild River	No alteration of natural water quality						
Scenic River	No alteration of natural water quality						

¹ Standards for Trout Streams for dissolved oxygen are an average of 6.0 mg/l and a minimum of 5.0 mg/l. No temperature alteration is allowed in Primary Trout Streams and a temperature change of 2 °F is allowed in Secondary Trout Streams.

² Geometric means should be "based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours." The geometric mean of a series of N terms is the Nth root of their product. Example: the geometric mean of 2 and 18 is the square root of 36.

³ Standards are same as fishing with the exception of dissolved oxygen which is site specific.

Table 5-3. Georgia Narrative Water Quality Standards for All Waters (Excerpt from Georgia Rules and Regulations for Water Quality Control Chapter 391-3-6-.03 - Water Use Classifications and Water Quality Standards)

- (5) General Criteria for All Waters. The following criteria are deemed to be necessary and applicable to all waters of the State:
- (a) All waters shall be free from materials associated with municipal or domestic sewage, industrial waste or any other waste which will settle to form sludge deposits that become putrescent, unsightly or otherwise objectionable.
 - (b) All waters shall be free from oil, scum and floating debris associated with municipal or domestic sewage, industrial waste or other discharges in amounts sufficient to be unsightly or to interfere with legitimate water uses.
 - (c) All waters shall be free from material related to municipal, industrial or other discharges which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses.
 - (d) All waters shall be free from toxic, corrosive, acidic and caustic substances discharged from municipalities, industries or other sources, such as nonpoint sources, in amounts, concentrations or combinations which are harmful to humans, animals or aquatic life.
 - (e) All waters shall be free from turbidity which results in a substantial visual contrast in a waterbody due to man-made activity. The upstream appearance of a body of water shall be observed at a point immediately upstream of a turbidity-causing man-made activity. The upstream appearance shall be compared to a point which is located sufficiently downstream from the activity so as to provide an appropriate mixing zone. For land disturbing activities, proper design, installation and maintenance of best management practices and compliance with issued permits shall constitute compliance with [this] Paragraph...

- determine improvements resulting from upgraded water pollution control plants,
- support enforcement actions,
- establish wasteload allocations for new and existing facilities,
- verify water pollution control plant compliance,
- document water use impairment and reasons for problems causing less than full support of designated water uses, and
- develop Total Maximum Daily Loads.

EPD used a variety of monitoring tools to collect information to determine if the waterbodies are supporting its designated use. These tools include trend monitoring, intensive surveys, lake, coastal, biological, fish tissue, and toxic substance monitoring, and facility compliance sampling. Each of these is briefly described in the following sections.

Trend Monitoring

Long term monitoring of streams at strategic locations throughout Georgia, trend or ambient monitoring, was initiated by EPD during the late 1960s. This work was and continues to be accomplished to a large extent through cooperative agreements with federal, state, and local agencies who collect samples from groups of stations at specific, fixed locations throughout the year. The cooperating agencies conduct certain tests in the field and send stream samples to EPD for additional laboratory analyses. Although there have been a number of changes over the years, routine chemical trend monitoring is still accomplished through similar cooperative agreements.

Today EPD contracts with the United States Geological Survey (USGS) for the majority of the trend sampling work. In addition to monthly stream sampling, a portion of the work with the USGS involves continuous monitoring at several locations across the state. EPD associates also collect water and sediment samples for toxic substance analyses, as well as macroinvertebrate samples to characterize the biological community at selected locations as a part of the trend monitoring effort. WRD associates also assess fish communities as a part of the monitoring effort. Additional samples used in the assessment were collected by other federal, state and local governments, universities, contracted Clean Lakes projects and utility companies. Trend monitoring stations located in the Ogeechee basin are shown in Figure 5-1.

Focused Trend Monitoring in the Ogeechee River Basin

In 1995, EPD adopted and implemented significant changes to the strategy for trend monitoring in Georgia. The changes were implemented to support the River Basin Management Planning program. The number of fixed stations statewide was reduced in order to focus resources for sampling and analysis in a particular group of basins in any one year in accordance with the basin planning schedule. Sampling focus was placed on the Savannah River basin and Ogeechee River basin during the 1997 sampling. In mid-1997 an additional effort was made to provide for quarterly sampling of fecal coliform (with four samples collected in a thirty day period), and for metals sampling twice per day. To accomplish this effort sampling in the Savannah and Ogeechee basins was continued through 1998.

Figure 5-2 shows the focused trend monitoring network for the Ogeechee River basin used in 1997-1998. During this period statewide trend monitoring was continued at the 37 core station locations statewide, in the Savannah Harbor, and at all continuous monitoring locations. The remainder of the trend monitoring resources were devoted to

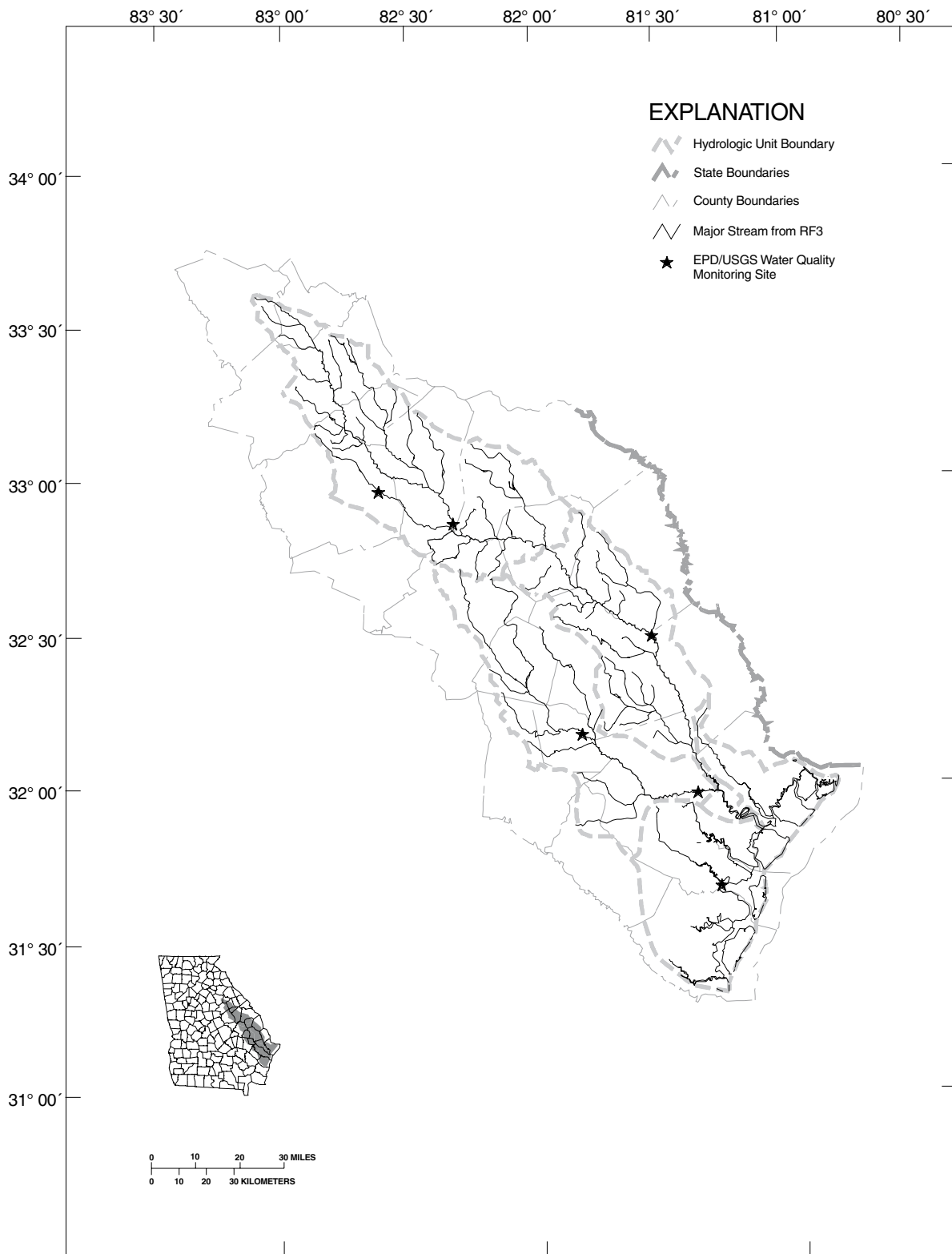


Figure 5-I. Ogeechee River Basin Fixed Sampling Station Locations

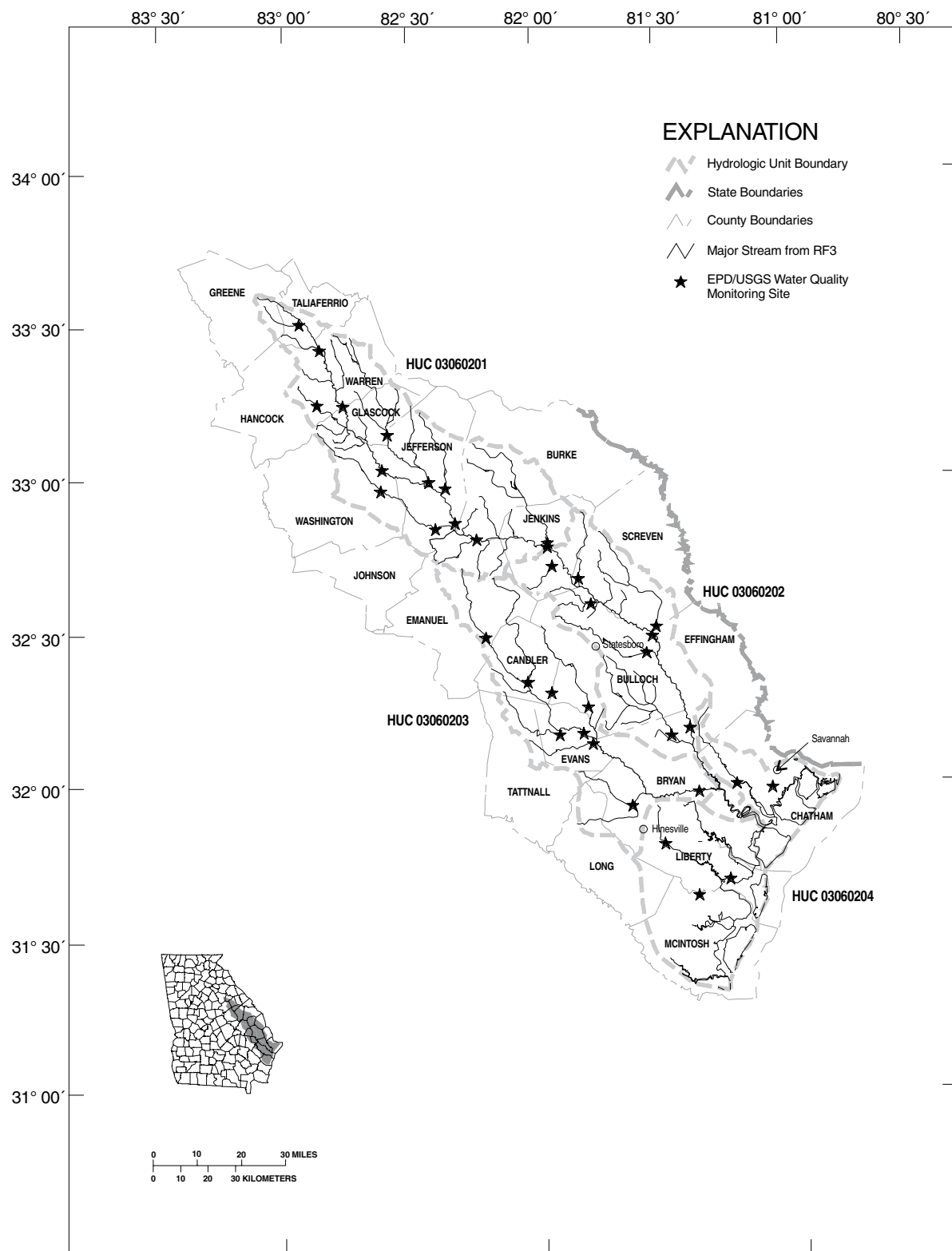


Figure 5-2. Ogeechee River Basin Trend Monitoring Network Station Locations

the Savannah and Ogeechee River basins. As a result, more sampling was conducted in the focus river basins. Increasing the resolution of the water quality monitoring improves the opportunity to identify impaired waters, as well as the causes of impairment.

Intensive Surveys

Intensive surveys complement long-term fixed station monitoring to focus on a particular issue or problem over a shorter period of time. Several basic types of intensive surveys are conducted, including model calibration surveys and impact studies. The purpose of a model calibration survey is to collect data to calibrate a mathematical water quality model. Models are used for wasteload allocations and/or TMDLs and as tools for use in making regulatory decisions. Impact studies are conducted when information on the cause-and-effect relationships between pollutant sources and receiving waters is needed. In many cases biological information is collected along with chemical data for use in assessing environmental impacts.

Lake Monitoring

EPD has maintained monitoring programs for Georgia's public access lakes for many years. In the late 1960s, a comprehensive statewide study was conducted to assess fecal coliform levels at public beaches on major lakes in Georgia as the basis for water use classifications and establishment of water quality standards for recreational waters. In 1972, EPD staff participated in the USEPA National Eutrophication Survey, which included 14 lakes in Georgia. A postimpoundment study was conducted for West Point Lake in 1974. Additional lake monitoring continued through the 1970s. The focus of these studies was primarily problem/solution-oriented and served as the basis for regulatory decisions.

Trophic Condition Monitoring

In 1980-1981, EPD conducted a statewide survey of public access freshwater lakes. The study was funded in part by USEPA Clean Lakes Program funds. The survey objectives were to identify freshwater lakes with public access, assess each lake's trophic condition, and develop a priority listing of lakes as to need for restoration and/or protection. In the course of the survey, data and information were collected on 175 identified lakes in 340 sampling trips. The data collected included depth profiles for dissolved oxygen, temperature, pH, specific conductance, and Secchi disk transparency and chemical analyses for chlorophyll *a*, total phosphorus, nitrogen compounds, and turbidity.

Fish Tissue Monitoring

The DNR conducts fish tissue monitoring for toxic chemicals and issues fish consumption guidelines as needed to protect human health. It is not possible for the DNR to sample fish from every stream and lake in the state. However, high priority has been placed on the 26 major reservoirs which make up more than 90 percent of the total lake acreage. These lakes will continue to be sampled as part of the River Basin Management Planning 5-year rotating schedule to track trends in fish contaminant levels. The DNR has also made sampling fish in rivers and streams down-stream of urban and/or industrial areas a high priority. In addition, DNR will focus attention on areas which are frequented by a large number of anglers.

The program includes testing of fish tissue samples for the substances listed in Table 5-4. Of the 43 constituents tested, only PCBs, chlordane, and mercury have been found in fish at concentrations which could create risk to human health from fish consumption.

Table 5-4. Parameters for Fish Tissue Testing

Antimony	a-BHC	Heptachlor
Arsenic	b-BHC	Heptachlor Epoxide
Beryllium	d-BHC	Toxaphene
Cadmium	g-BHC (Lindane)	PCB-1016
Chromium, Total	Chlordane	PCB-1221
Copper	4,4-DDD	PCB-1232
Lead	4,4-DDE	PCB-1242
Mercury	4,4-DDT	PCB-1248
Nickel	Dieldrin	PCB-1254
Selenium	Endosulfan I	PCB-1260
Silver	Endosulfan II	Methoxychlor
Thallium	Endosulfan Sulfate	HCB
Zinc	Endrin	Mirex
Aldrin	Endrin Aldehyde	Pentachloroanisole
		Chlorpyrifos

The test results have been used to develop consumption guidelines which are updated annually and provided to fishermen when they purchase fishing licenses. This program will continue and will be coordinated as a part of the Rive Basin Management Planning process in the future.

In 1994, EPD began utilizing a “risk-based” approach to develop fish consumption guidelines for the state’s waters. The EPD’s guidelines are based on the use of USEPA potency factors for carcinogenicity and reference doses for noncancer toxicity, whichever is most protective. Inputs used in the derivation of guidelines include a 1×10^{-4} risk level for cancer, a 30 year exposure duration, 70 kg as body weight for an adult, and 70 years as the lifetime duration. A range of possible intakes from a low of 3g/day to a high of 30 g/day is evaluated and one of four different recommendations made: no restriction, limit consumption to 1 meal per week, limit consumption to 1 meal per month, or do not eat.

Toxic Substance Stream Monitoring

EPD has focused resources on the management and control of toxic substances in the state’s waters for many years. Toxic substance analyses were conducted on samples from selected trend monitoring stations from 1973-1991. Wherever discharges were found to have toxic impacts or to include toxic pollutants, EPD has incorporated specific limitations on toxic pollutants in NPDES discharge permits.

In 1983 EPD intensified toxic substance stream monitoring efforts. This expanded toxic substance stream monitoring project includes facility effluent, stream, sediment, and fish sampling at specific sites downstream of selected industrial and municipal discharges. From 1983 through 1991, 10 to 20 sites per year were sampled as part of this project. Future work will be conducted as a part of the River Basin Management Planning process.

Facility Compliance Sampling

In addition to surface water quality monitoring, EPD conducts evaluations and compliance sampling inspections of municipal and industrial water pollution control plants. Compliance sampling inspections include the collection of 24-hour composite samples, as well as evaluation of the permittee’s sampling and flow monitoring requirements.

More than 280 sampling inspections were conducted by EPD staff statewide in 1997. The results were used, in part, to verify the validity of permittee self-monitoring data and as supporting evidence, as applicable, in enforcement actions. Also, sampling inspections can lead to identification of illegal discharges. In 1997, this work was focused on facilities in the Savannah and Ogeechee River basins in support of the basin planning process.

Aquatic Toxicity Testing

In 1982 EPD incorporated aquatic toxicity testing into selected industrial NPDES permits. In January 1995, EPD issued approved NPDES Reasonable Potential Procedures, which further delineated required conditions for conducting whole effluent toxicity (WET) testing for municipal and industrial discharges. All major permitted discharges (flow greater than 1 MGD) are required to have WET tests run with each permit reissuance. Certain minor dischargers are also subject to this requirement if EPD determines that aquatic toxicity is a potential issue.

5.2.3 Data Analysis

Assessment of Use Support - General Procedures

EPD assesses water quality data to determine if water quality standards are met and if the waterbody supports its classified use. If monitoring data shows that standards are not achieved, depending on the frequency with which standards are not met, the waterbody is said to be not supporting or partially supporting the designated use (see box).

Appendix E includes lists of all streams and rivers in the basin for which data have been assessed. The lists include information on the location, data source, designated water use classification, criterion violated, potential cause, actions planned to alleviate the problem, and estimates of stream miles affected. The list is further coded to indicate status of each waterbody under several sections of the Federal Clean Water Act (CWA). Different sections of the CWA require states to assess water quality (Section 305(b)), to list waters still requiring TMDLs (Section 303(d)), and to document waters with nonpoint source problems (Section 319).

The assessed waters are described in three categories: waters supporting designated uses, waters partially supporting designated uses, and waters not supporting designated uses. Waters were placed on the partially supporting list if:

- The chemical data (dissolved oxygen, pH, temperature) indicated an excursion of a water quality standard in 11 percent - 25 percent of the samples collected.
- A fish consumption guideline was in place for the waterbody.

The partially supporting list also includes stream reaches based on predicted concentrations of metals at low stream flow (7Q10 flows) in excess of state standards as opposed to actual measurements on a stream sample. Generally, a stream reach was placed on the not supporting list if:

- The chemical data (dissolved oxygen, pH, temperature) indicated an excursion of a water quality standard in greater than 25 percent of the samples collected.
- A fish consumption ban was in place for the waterbody.
- Acute or chronic toxicity tests documented or predicted toxicity at low stream flow (7Q10) due to a municipal or industrial discharge to the waterbody.

Analysis of data for fecal coliform bacteria, metals, toxicity, dissolved oxygen, fish/shellfish consumption advisories, and biotic data.

Fecal Coliform Bacteria

Georgia water quality standards establish a fecal coliform criterion of a geometric mean (four samples collected over a 30-day period) of 200 MPN/100 mL for all waters in Georgia during the recreational season of May through October. This is the year-round standard for waters with the water use classification of recreation. For waters classified as drinking water, fishing, or coastal fishing, for the period of November through April, the fecal coliform criterion is a geometric mean (four samples collected over a 30-day period) of 1000 per 100 ml and not to exceed 4000 per 100 ml for any one sample. The goal of fecal coliform sampling in the Ogeechee and Savannah River basin focused monitoring in 1997-1998 was to collect four samples in a thirty day period in each of four quarters. If one geometric mean was in excess of the standard then the stream segment was placed on the partial support list. If more than one geometric mean was in excess of the standard the stream segment was placed on the not support list.

In some cases the number of samples was not adequate to calculate geometric means. In these cases, the USEPA recommends the use of a review criterion of 400 per 100 ml to evaluate sample results. This bacterial density was used to evaluate data for the months of May through October and the maximum criterion of 4000 per 100 ml was used in assessing the data from the months of November through April. Thus, where geometric mean data was not available, waters were deemed not supporting uses when 26 percent of the samples had fecal coliform bacteria densities greater than the applicable review criteria (400 or 4000 MPN/100 mL) and partially supporting when 11 to 25 percent of the samples were in excess of the review criterion.

Metals

Since data on metals from any one given site are typically infrequent, using the general evaluation technique of 26 percent excursion to indicate nonsupport and 11 to 25 percent excursion to indicate partial support was not meaningful. Streams were placed in the nonsupporting category if multiple excursions of state criteria occurred and the data were based on more than four samples per year. With less frequent sampling, streams with excursions were placed on the partially supporting list. In addition, an asterisk appears beside metals data in those cases where there is a minimal database. Data were collected in the winter and the summer seasons for the Ogeechee and Savannah for comparison to water quality standards. Clean techniques were used. If one of the samples was in excess of the standard the stream segment was placed on the partial support list. This approach is in accordance with US EPA guidance, which suggests any single excursion of a metals criteria be listed.

Toxicity Testing/Toxic Substances

Data from EPD toxicity testing of water pollution control plant effluents were used to predict toxicity in the receiving waterbody at critical, low flows. Effluent data for metals were used to designate either partial support or nonsupport based on whether instream corroborating metals data were available. When instream metals data were available the stream was determined to be not supporting if a metal concentration exceeded stream standards; when instream data were not available, the stream was listed as partially supporting.

Dissolved Oxygen, pH, Temperature

When available data indicated that these parameters were out of compliance with state standards more than 25 percent of the time, the waters were evaluated as not supporting the designated use. Between 11 percent and 25 percent noncompliance resulted in a partially supporting evaluation.

Fish/Shellfish Consumption Guidelines

A waterbody was included in the not supporting category when an advisory for "no consumption" of fish, a commercial fishing ban, or a shellfishing ban based on actual data was in effect. A waterbody was placed in the partially supporting category if a guideline for restricted consumption of fish had been issued for the waters.

Biotic Data

A "Biota Impacted" designation for "Criterion Violated" indicates that studies showed a modification of the biotic community. Communities used were fish. Studies of fish populations by the DNR Wildlife Resources Division used the Index of Biotic Integrity (IBI) to identify affected fish populations. The IBI values were used to classify the population as Excellent, Good, Fair, Poor, or Very Poor. Stream segments with fish populations rated as "Poor" or "Very Poor" were included in the partially supporting list.

Additional specific detail is provided in the following paragraphs on analysis of data for fecal coliform bacteria, metals, toxicity, dissolved oxygen, fish/shellfish consumption advisories, and biotic data.

5.2.4 Assessment of Water Quality and Use Support

This section provides a summary of the assessment of water quality and support of designated uses for streams and major lakes in the Ogeechee River basin. Most of these results were previously summarized in the Georgia 2000 305(b)/303(d) listing (Georgia DNR, 2000). Results are presented by HUC. A geographic summary of assessment results is provided by HUC in Figures 5-3 through 5-6.

Upper Ogeechee River (HUC 03060201)

Appendix E summarizes the determination of support for designated uses of all assessed rivers and streams within this hydrologic unit (GA DNR, 2000).

Monitoring data was collected from 14 trend monitoring stations located within this subbasin during the 1997-1998 period, eight of which were on the mainstem. Historically, no trend monitoring stations were sampled within this subbasin. The following assessment is based on data from these trend monitoring stations.

Data from the mainstem stations indicate that water quality conditions are being affected by nonpoint source pollution.

Fecal Coliform Bacteria

The water use classification of fishing was not fully supported in one Ogeechee River mainstem segment and six tributary stream segments due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources and/or animal wastes.

Erosion and Sedimentation

The water use classifications of fishing, recreation, and drinking water are potentially threatened in waterbodies by erosion and loading of sediment which can alter stream morphology, impact habitat, and reduce water clarity. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

Fish Consumption Guidelines

The water use classification of fishing was not fully supported in one segment of the Ogeechee River mainstem due to fish consumption guidelines recommended because of mercury residues. The guidelines are for largemouth bass, spotted sucker and redbreast sunfish. The water use classifications was not fully supported in Short Creek, a tributary to the Ogeechee River, due to fish consumption guidelines recommended because of mercury residue in sunfish.

Lower Ogeechee River (HUC 03060202)

Appendix E summarizes the determination of support for designated uses of all assessed rivers and streams within this hydrologic unit (GA DNR, 2000).

Monitoring data was collected from 8 trend monitoring stations located within this subbasin during the 1997-1998 period, two of which were on the mainstem. Historically, one trend monitoring station has been sampled within this subbasin. The following assessment is based on data from these trend monitoring stations.

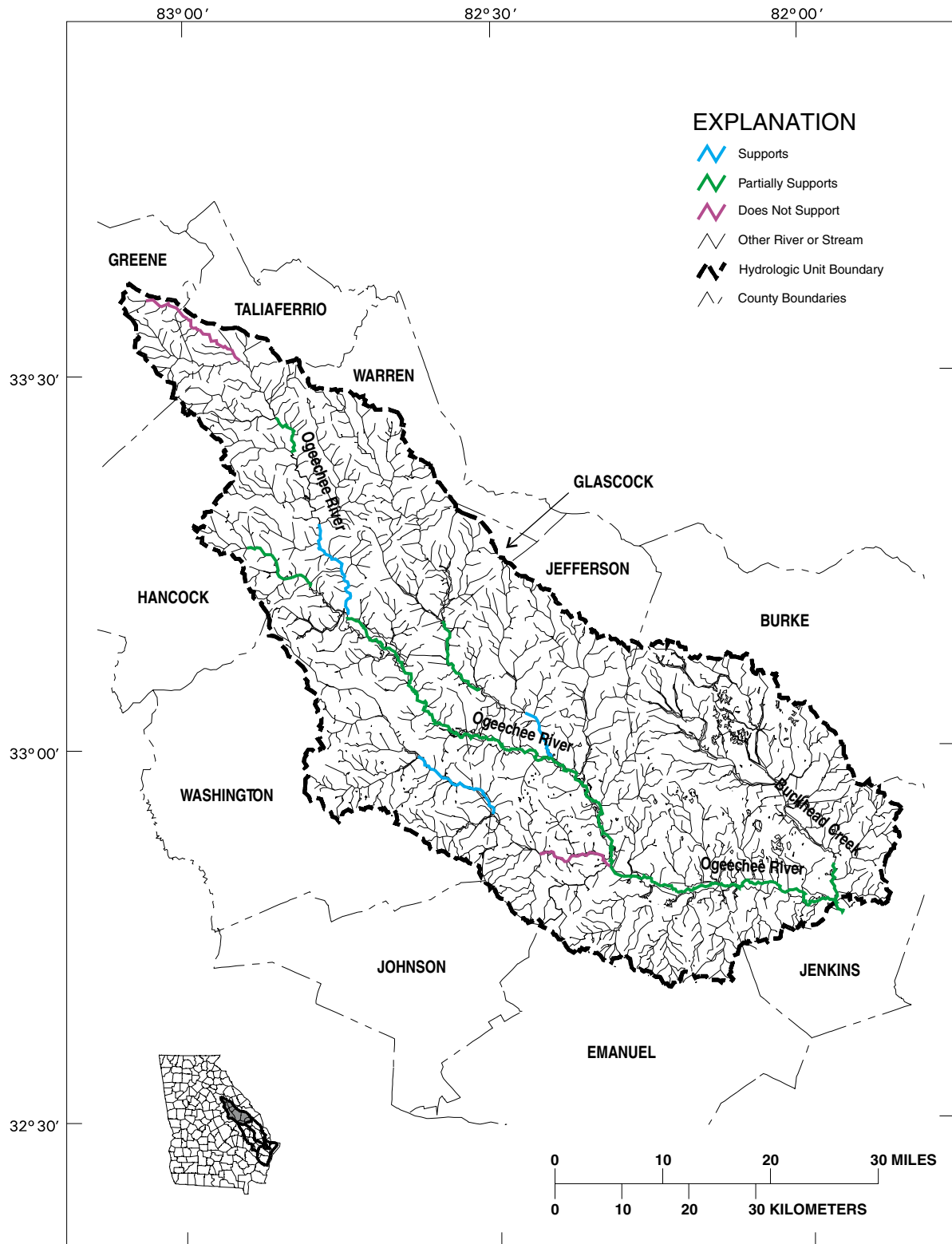


Figure 5-3. Assessment of Water Quality Use Support in the Ogeechee River Basin, HUC 03060201

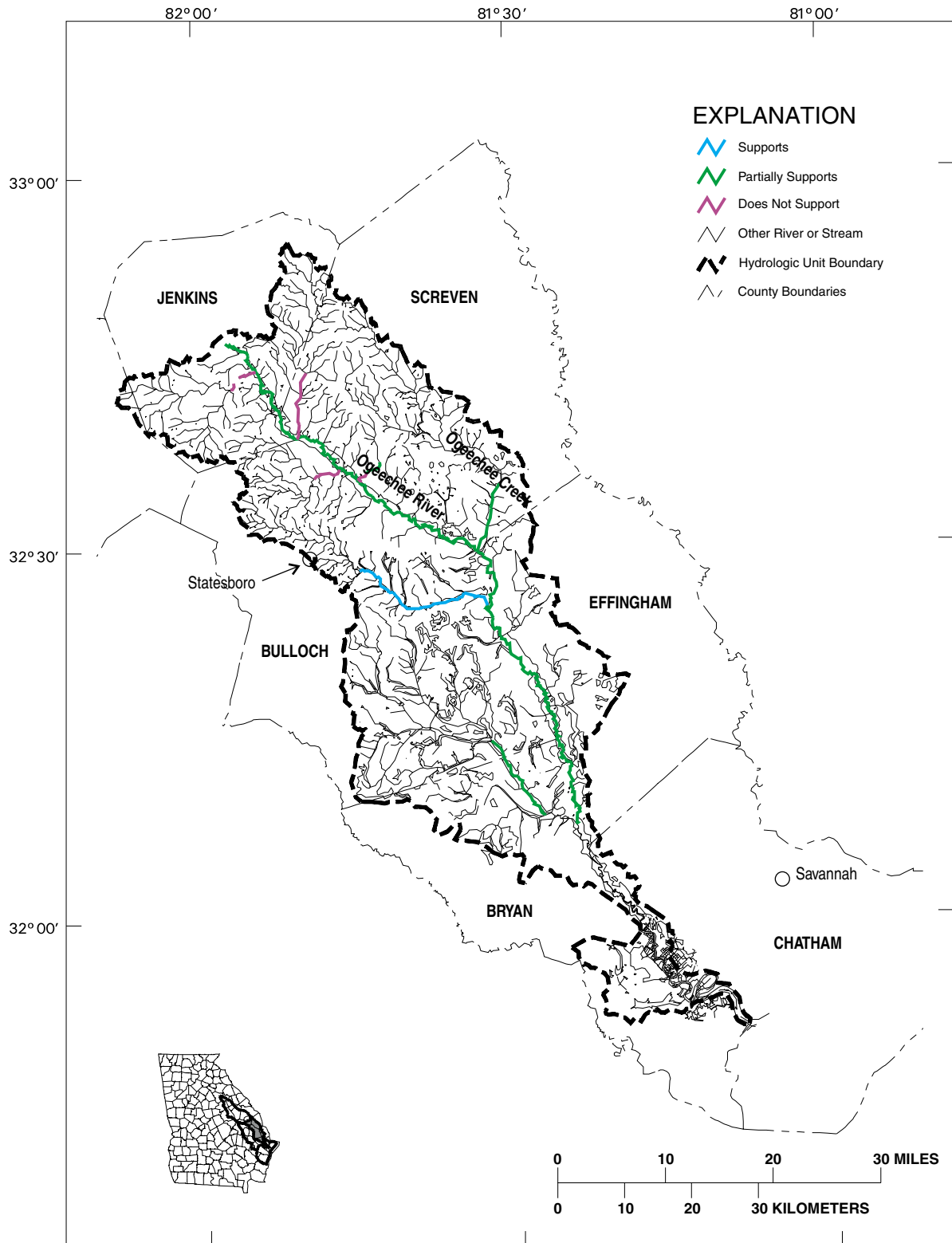


Figure 5-4. Assessment of Water Quality Use Support in the Ogeechee River Basin, HUC 03060202

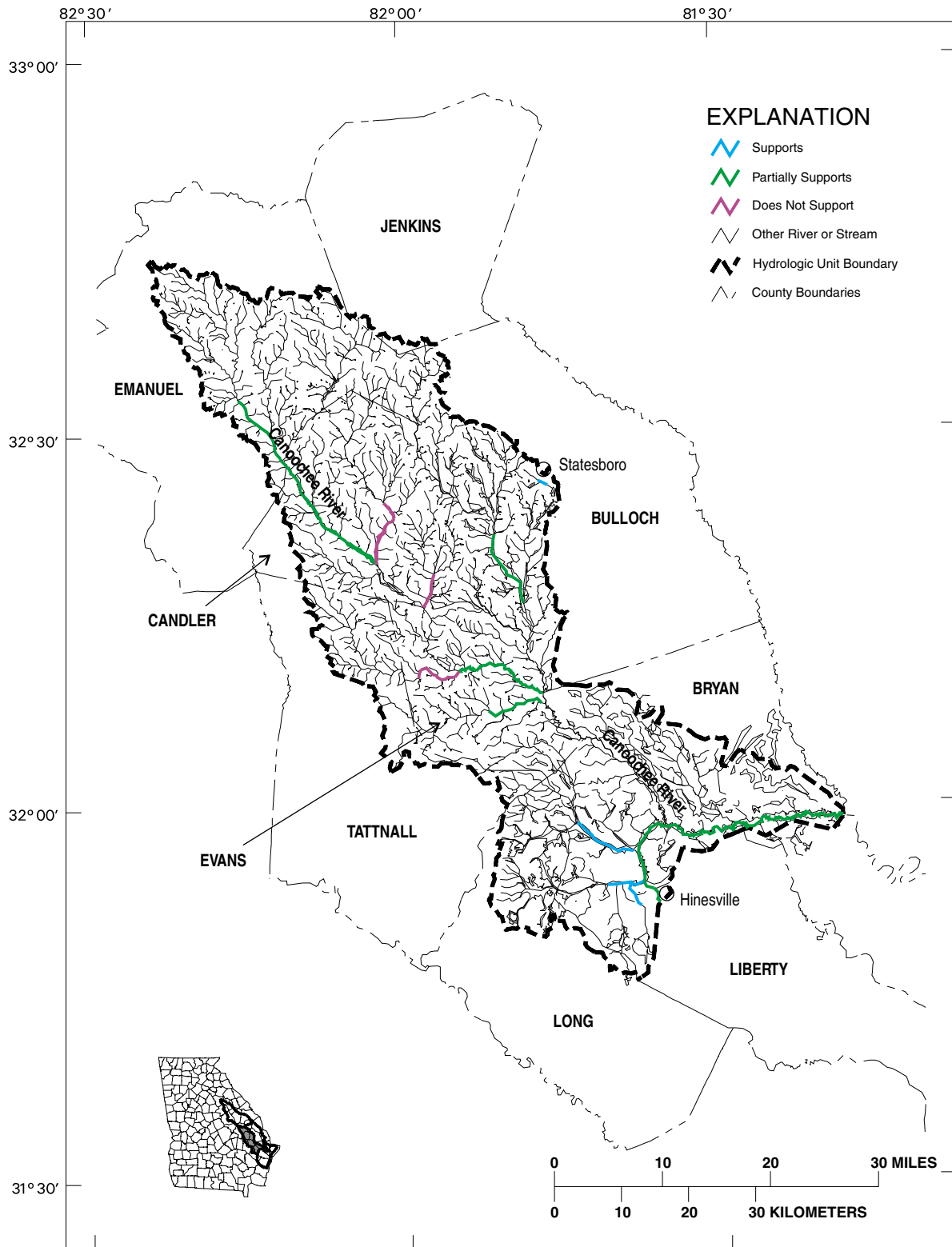


Figure 5-5. Assessment of Water Quality Use Support in the Ogeechee River Basin, HUC 03060203

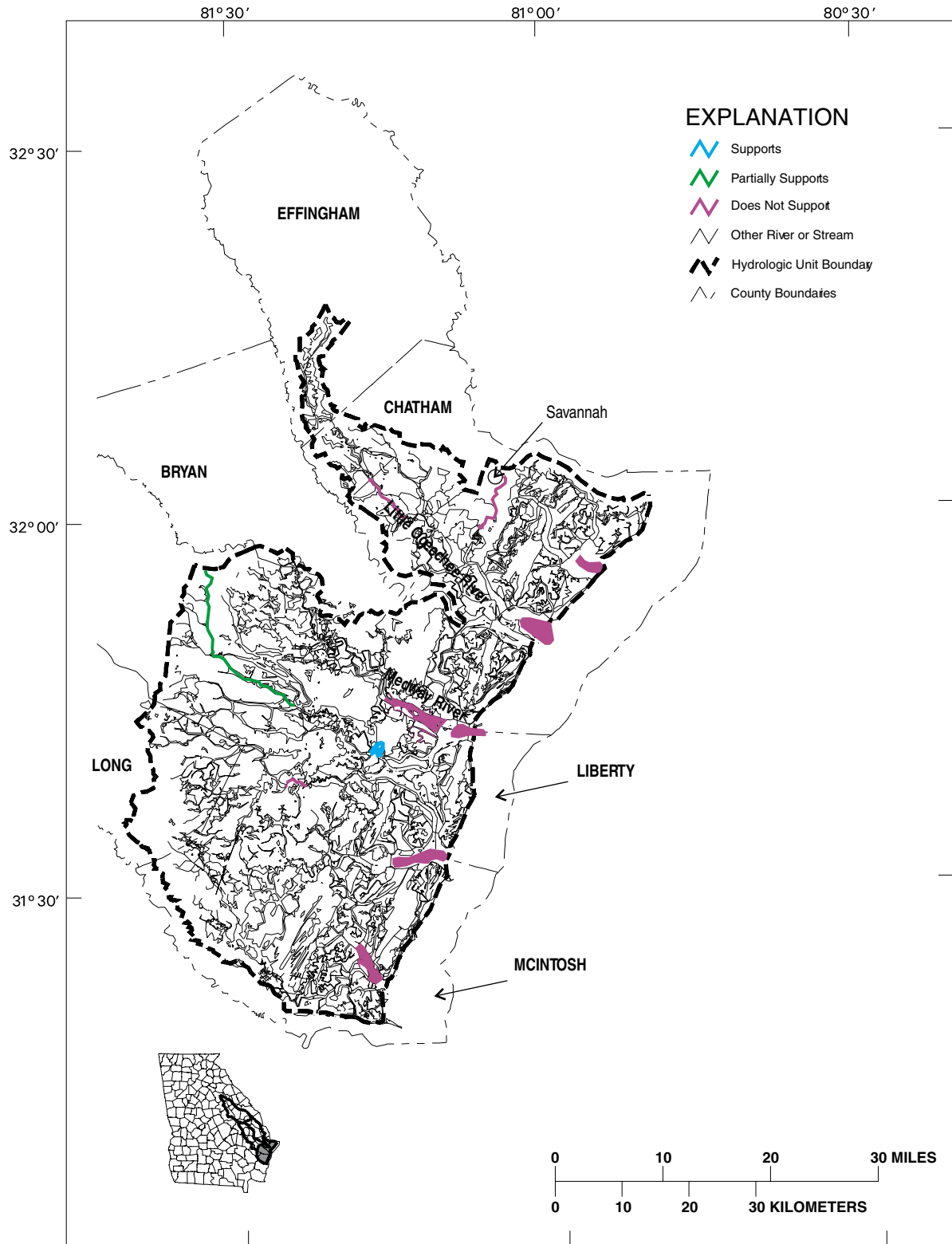


Figure 5-6. Assessment of Water Quality Use Support in the Ogeechee River Basin, HUC 03060204

Data from the mainstem stations indicate that water quality conditions are being affected by nonpoint source pollution.

Fecal Coliform Bacteria

The water use classification of fishing was not fully supported in five tributary stream segments due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources and/or animal wastes.

Erosion and Sedimentation

The water use classifications of fishing, recreation, and drinking water are potentially threatened in waterbodies by erosion and loading of sediment which can alter stream morphology, impact habitat, and reduce water clarity. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

Fish Consumption Guidelines

The water use classification of fishing was not fully supported in two Ogeechee River mainstem segments based on fish consumption guidelines due to mercury. The guidelines are for largemouth bass in one river segment and largemouth bass and redbreast sunfish in the second river segment.

Low Dissolved Oxygen

The water use classification of fishing was not fully supported in five tributaries due to dissolved oxygen concentrations less than standards. Low dissolved oxygen in the tributaries was due to nonpoint sources. Dissolved oxygen may be lower in these areas due to natural conditions.

Canoochee River (HUC 03060203)

Appendix E summarizes the determination of support for designated uses of all assessed rivers and streams within this hydrologic unit (GA DNR, 2000).

Monitoring data was collected from 9 trend monitoring stations located within this subbasin during the 1997-1998 period, three of which were on the mainstem. Historically, no trend monitoring stations were sampled within this subbasin. The following assessment is based on data from these trend monitoring stations.

Data from the mainstem stations indicate that water quality conditions are being affected by urban runoff and nonpoint source pollution.

Fecal Coliform Bacteria

The water use classification of fishing was not fully supported in one Canoochee River mainstem segment and three tributary stream segments due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources and/or animal wastes.

Erosion and Sedimentation

The water use classifications of fishing, recreation, and drinking water are potentially threatened in waterbodies by erosion and loading of sediment which can alter stream morphology, impact habitat, and reduce water clarity. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry

practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

Fish Consumption Guidelines

The water use classification of fishing was not fully supported in the Canoochee River mainstem and the Evans County Public Fishing Area (PFA) due to fish consumption guidelines recommended because of mercury residues. The guidelines are for largemouth bass, redbreast sunfish, and channel catfish in the river and largemouth bass in the PFA.

Low Dissolved Oxygen

The water use classification of fishing was not fully supported in one Canoochee River mainstem segment and seven tributaries due to dissolved oxygen concentrations less than standards. Low dissolved oxygen in the mainstem segment was due to urban runoff and low dissolved oxygen in the tributaries was due to nonpoint sources, urban runoff and a water pollution control plant discharge. Dissolved oxygen may be lower in these areas due to natural conditions.

Nutrients

The water use classifications of fishing; potentially threatened due to input of nutrients from agricultural runoff.

Ogeechee Coastal (HUC 03060204)

Appendix E summarizes the determination of support for designated uses of all assessed rivers and streams within this hydrologic unit (GA DNR, 2000).

Monitoring data was collected from 5 trend monitoring stations located within this subbasin during the 1997-1998 period. Historically, no trend monitoring stations were sampled within this subbasin. The following assessment is based on data from these trend monitoring stations.

Metals

The water use classification of fishing was not fully supported in one segment of the Newport River due to an exceedence of the water quality standard for selenium due to nonpoint sources.

Fecal Coliform Bacteria

The water use classification of fishing was not fully supported in six tributary stream segments due to exceedences of the water quality standard for fecal coliform bacteria. These may be attributed to a combination of urban runoff, septic systems, sanitary sewer overflows, rural nonpoint sources and/or animal wastes.

Erosion and Sedimentation

The water use classifications of fishing, recreation, and drinking water are potentially threatened in waterbodies by erosion and loading of sediment which can alter stream morphology, impact habitat, and reduce water clarity. Potential sources include urban runoff and development (particularly construction), unpaved rural roads, forestry practices, and agriculture. There are no stream segments listed at this time in this subbasin as not fully supporting designated water uses due to poor fish communities or sedimentation.

Low Dissolved Oxygen

The water use classification of fishing was not fully supported in four tributary stream segments due to dissolved oxygen concentrations less than standards. Low dissolved oxygen in the tributaries was due to urban runoff. Dissolved oxygen may be lower in these areas due to natural conditions.

Fish Consumption Guidelines

The water use classification of fishing was not fully supported in Casey Canal due to fish consumption conditions recommended because of dieldrin residues in striped mullet.

Prohibited Shellfish Harvesting Areas

Georgia's one-hundred linear mile coastline contains approximately 700,000 acres of potential shellfish habitat. Only about 10% of that area, however, actually produces viable shellfish stocks. Lack of suitable clutch, tidal amplitudes, littoral slope, and other geomorphological features contribute to the limited occurrence of natural shellfish resources along the Georgia coast. Most shellfish in Georgia grow in the narrow inter-tidal zone and are exposed between high water and low water tidal periods. Very few shellfish are naturally produced in sub-tidal waters.

Georgia maintains approximately 32,000 acres approved for the harvest of shellfish for commercial and/or personal consumption. In order to classify any growing area as "Approved" for the harvest of shellfish, the National Shellfish Sanitation Program's (NSSP) Manual of Operations (Part 1, Section 3,a) requires that Georgia show that the growing area "is not subject to contamination from human and/or animal fecal matter in amounts that in the judgement of the SSCA [State Shellfish Control Authority] may present an actual or potential hazard to public health." Georgia currently has three harvest areas comprised of commercial leases and public recreational plots. Table 5-5 indicates the location and size of those areas approved for shellfish harvest. Only those areas designated for Public Recreational Harvest or those areas under commercial lease are classified as "Approved". Approved areas are monitored regularly as discussed below. All other waters of the state are classified "Prohibited", are not monitored and are closed to the taking of shellfish due to the presence of human activities.

Table 5-5. Location and Size of Areas Approved for Shellfish Harvest

County	Approved	Leased	Public
Chatham	2,903 acres	1,400 acres (51.7%)	1,403 acres (48.3%)
Bryan/Liberty	0	0	0
McIntosh	14,902 acres	9,782 acres (65.6%)	5,120 acres (34.4%)
Glynn/Camden	14,011 acres	6,402 acres (45.7%)	7,609 acres (54.3%)

Standards of the NSSP further require the state to regularly collect water samples from each approved harvest area and to perform certain analytical procedures to ensure that the area is free from fecal matter as indicated by the absence of coliform bacteria. Georgia is vigorous in its approach to protecting the health of shellfish consumers. Although the guidelines of the National Shellfish Sanitation Program call for testing shellfish growing waters for contaminants on six occasions per year, the Coastal Resources Division doubles that effort by testing the waters twelve times per year.

During FY97 the Growing Area Element of the Georgia Shellfish Sanitation Project was evaluated by the Federal Food and Drug Administration. The project administered by Georgia Department of Natural Resources Coastal Resources Division was found to be in full compliance with the National Shellfish Sanitation Program (NSSP) requirements.

References

Georgia Environmental Protection Division 1987. Water Availability and Use Report, Coastal Plain River Basins.

DRI/McGraw Hill. 1996. The Regional Economic Forecast of Population and Employment Comprehensive Study, Volume 1. Prepared for: Georgia Department of Natural Resources Environmental Protection Division. DRI/McGraw-Hill, Lexington, MA.